

**PHYSICS 211**  
**ESSENTIALS OF PHYSICS I**

**BULLETIN INFORMATION**

PHYS 211 - Essentials of Physics I (3 credit hours)

**Course Description:**

Classical mechanics and wave motion. Calculus-level course for students of science and engineering.

Corequisite: PHYS 211L

Prerequisites: a grade of C or better in MATH 141

**SAMPLE COURSE OVERVIEW**

The course material is partially based on the Chapters 1 - 15 of the textbook by Halliday, Resnick, and Walker. The learning outcome as a result of successfully completing this course is a good understanding of the presented physics concepts and proficiency in solving related problems, like those given in the textbook at the end of each chapter.

**ITEMIZED LEARNING OUTCOMES**

**Upon successful completion of Physics 211, students will be able to:**

1. Demonstrate the ability to identify the appropriate concepts to analyzing situations involving physics.
2. Demonstrate the use of physical laws to solve quantitative problems in the areas of: kinematics, Newton's laws, force, torque, linear momentum, angular momentum, energy, and conservation laws.
3. Apply these concepts to a wide range of phenomena and examples from everyday life such as motion of objects, friction, collisions, rolling objects, gravitation between planets, properties of fluids, and oscillations.
4. Demonstrate the use of scientific methods in their solutions to problems, following techniques modeled in class by the instructor.

**SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS**

1. Halliday, Resnick, Walker, Fundamentals of Physics, 9th Edition (2011), John Wiley & Sons
2. Earlier editions of those textbook or other calculus-based, introductory physics textbooks are suitably as well. Some examples include:
  - a. Giancoli, Physics for Scientists & Engineers, Prentice Hall
  - b. Tipler and Mosca, Physics for Scientists and Engineers, W.H. Freeman and Company, New York
  - c. Young and Freedman, Sears and Zemansky's University Physics with Modern Physics, Pearson Addison Wesley

- d. Bauer, Westfall, University Physics, McGraw Hill
3. *i>clicker*: *i>clickers* (available at the USC Bookstore) are required for this class for in-class participation.

### **SAMPLE ASSIGNMENTS AND/OR EXAM**

1. **Homework:** Homework assignments will be given. We will make use of the *Learning Online Network with CAPA* system to distribute and grade the homework. You will generally have one week to work on the homework. You will get instant feedback as to whether your answers are correct and you can generally try up to 10 times to find the correct answer, during the time allowed. Generally, the homework will be due by 10:00 PM on Wednesdays. Answers will be made available shortly thereafter; no late homework will be accepted. Occasionally the network is slow or disabled, so plan ahead. Deadlines will not be changed due to network latency. Test problems will look similar to the homework problems, so mastering the homework is key to getting a good grade in the course.
2. **Reading Assignments and Quizzes:** The chapters covered in class are specified in the syllabus and should be read prior to the class period. The interactive lectures will contain questions from your reading, previous lectures, and homework problems. They are intended to help your learning. In-class participation will be rewarded, scored by the *i>clicker* system.
3. **Mid-term Tests:** Three CAPA-style tests will be given. The tests may consist of conceptual questions as well as problem solving questions.
4. **Final Exam:** The final exam is comprehensive and will include all material covered during the semester. All students must take the final exam. The final exam is worth 30% of your total course score. If the grade of a mid-term exam or the quiz grade is lower than the grade of the final exam then that activity (one mid-term or the quizzes) will be dropped and the final exam will absorb the weight of that activity.

### **SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS**

Week 1: Chapters 1, 2 Measurement & Motion Along a Straight Line

Week 2: Chapters 3, 4 Vectors & Motion in Two and Three Dimensions

Week 3: Chapter 5 Force and Motion I

Week 4: Chapter 6 Force and Motion II

**First Test: Chapters 1 – 5**

Week 5: Chapter 7 Kinetic Energy, Work, and Power

Week 6: Chapter 8 Potential Energy and Energy Conservation

Week 7: Chapter 9 Center of Mass, Linear Momentum, Collision

Week 8: Chapter 10 Rotation

**Chapters 6 - 9 Second Test**

Week 9: Chapter 11 Rolling, Torque, and Angular Momentum

Week 10: Chapter 11 Rolling, Torque, and Angular Momentum

Week 11: Chapter 12 Equilibrium and Elasticity

Week 12: Chapter 13 Gravitation

**Chapters 10 – 12 Third Test**

Week 13: Chapter 14 Fluids

Week 14: Chapter 15 Oscillation

Week 15: Chapters 1 – 15 Recitation

**1 - 15 Final exam according to University exam schedule**